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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,220	12/02/2003	John C. Schultz	59333US002	5391
32692	7590	05/12/2005	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY			HUYNH, ANDY	
PO BOX 33427			ART UNIT	
ST. PAUL, MN 55133-3427			PAPER NUMBER	

2818

DATE MAILED: 05/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/727,220

Applicant(s)

SCHULTZ ET AL.

Examiner

Andy Huynh

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 26-39 is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-18, 20-22, 24 and 25 is/are rejected.
- 7) ☒ Claim(s) 9, 19 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claims **1-39** are currently pending in the application is acknowledged.

Information Disclosure Statement

This office acknowledges receipt of the following items from the applicant: Information Disclosure Statements (IDSs) filed on 03/04/2005, 02/24/2005, 08/16/2004, 08/03/2004 and 04/15/2004. The references cited on the PTOL 1449 form have been considered.

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims **1, 3-8, 18-22, 24** are also rejected under 35 U.S.C. 102(e) as being anticipated by Sugimoto et al. (USP 6,874,910 hereinafter referred to as "Sugimoto").

Regarding claims **1 and 8**, Sugimoto discloses in Fig. 1 and the corresponding texts as set forth in column 10, line 45-column 12, line 34, an illumination assembly/a light source apparatus 1 comprises:

a substrate comprising an electrically insulative layer/an insulating member 4 on a first side of the substrate and an electrically conductive layer/a radiator plate made of thermally conductive material 3 on a second side of the substrate;

a plurality of LED dies/LED chips 2, each LED die/LED chip disposed in a via/a through hole 6 extending through the electrically insulative layer/the insulating member on the first side of the substrate to the electrically conductive layer/the radiator plate on the second side of the substrate, each LED die/LED chip operatively connected through the via/the through hole to the electrically conductive layer/the radiator plate on the second side of the substrate.

Regarding claim 3, Sugimoto discloses the electrically insulative layer/the insulating member made of polymer on the first side of the substrate.

Regarding claim 4-6, Sugimoto discloses all the claimed limitations except for the via extending through the electrically insulative material is chemically etched, plasma etched, or laser milled. However, the limitations "the via extending through the electrically insulative material is chemically etched, plasma etched, or laser milled" is taken to be a product by process limitation and consider non-limitation. In a product-by-process claim, it is the patentability of the claimed product and not of the recited process steps which must be established. Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. The Patent Office is not equipped to manufacture products by a myriad of processes put before it and then obtain prior art product and make physical comparisons therewith. In re Brown, 173 USPQ 685 (CCPA 1972). Also, a product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ I S at 17 (footnote 3).

Art Unit: 2818

See *In re Fessman*, 180 USPQ 324, 326 (CCPA 1974); *In re Marosi et al.*, 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process" claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Regarding claim 7, Sugimoto discloses the electrically conductive layer on the second side of the substrate comprises a material selected from the group comprising copper, nickel, gold, aluminum, tin, lead, or a combination thereof (col. 10, line 55).

Regarding claims **18 and 20-22**, Sugimoto discloses in Fig. 1 and the corresponding texts as set forth in column 10, line 45-column 12, line 34, an illumination apparatus/a light source apparatus 1 comprises:

a substrate having an electrically insulative layer/an electrically insulating member 4 on a first surface and an electrically conductive layer/a radiator plate made of thermally conductive material 3 on a second surface, a plurality of mounting vias/through holes 6 extending through the electrically insulating layer to the electrically conductive layer/the radiator plate;

a plurality of light emitting elements/LED chips 2 disposed in the plurality of mounting vias/through holes, wherein the light emitting elements are operatively connected to the electrically conductive layer through the mounting vias/through holes.

Art Unit: 2818

Regarding claim 24, Sugimoto discloses in Fig. 1 the illumination apparatus/the light source apparatus further comprises a thermally conductive encapsulant/a sealing rein 10 contacting the light emitting elements and electrically insulating layer.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al. (USP 6,874,910 hereinafter referred to as "Sugimoto") in view of Matsui et al. (US Pub. No. 2003/0052594 A1 dated 03/20/2003 filed 09/17/2002 hereinafter referred to as "Matsui").

Sugimoto discloses all the claimed limitations as above except for the substrate is flexible. Matsui teaches that a flexible substrate is used in a lighting apparatus for the flexibility. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use a flexible substrate in a lighting apparatus for the flexibility as taught by Matsui.

Claims 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugimoto et al. (USP 6,874,910 hereinafter referred to as "Sugimoto").

Art Unit: 2818

Regarding claims **10-11 and 16**, Sugimoto discloses the claimed limitations except for the illumination assembly further comprises a heat dissipation assembly disposed adjacent the second side of the substrate wherein the heat dissipation assembly is separated from the second side of the substrate by a layer of material that is thermally conductive. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form a heat dissipation assembly disposed adjacent the second side of the substrate used as a heat sink, and form a thermally conductive layer between the heat dissipation assembly and the second side of the substrate to enhance heat dissipation.

Regarding claims **12-15 and 17**, Sugimoto discloses the claimed limitations except for the thermally conductive, material is an adhesive; wherein the thermally conductive, adhesive material is a polymer adhesive loaded with boron nitride; wherein the thermally conductive, material is non-adhesive; wherein the thermally conductive, non-adhesive material is a polymer loaded with silver particles; and wherein the thermally conductive member comprises a material selected from the group comprising metals and polymers. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to select either one of the thermally conductive materials as above, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Allowable Subject Matter

Claims 9, 19 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior art made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. The prior art of record, taken alone or in combination, fails to teach or suggest the illumination assembly wherein the electrically conductive layer is patterned to define a plurality of electrically isolated heat spreading elements, each LED die electrically and thermally coupled to an associated heat spreading element as recited in claim 9; the illumination apparatus wherein the electrically conductive layer is patterned to define a plurality of heat spreading elements as recited in claim 19; the illumination apparatus further comprises a plurality of wirebond vias extending through the electrically insulating layer to the electrically conductive layer, each wirebond via exposing a corresponding wirebond connection pad of the electrically conductive layer as recited in claim 23;

Claims 26-39 are allowed. The following is a statement of reason for the indication of allowable subject matter:

Claims 26-39 are considered allowable since the prior art made of record and considered pertinent to the application's disclosure do not teach or suggest the claimed limitations.

Regarding claims 26-34, the prior art of record fails to teach or render obvious an illumination apparatus comprises a layer of conductive material patterned to form a plurality of adjacent heat spreading elements, and a plurality of light emitting elements, each light emitting element thermally and electrically coupled to the heat spreading element associated with a via, and in

Art Unit: 2818

combination with all other features as recited in independent claim 26. Regarding claims 35-39, the prior art of record fails to teach or render obvious a flexible circuit comprises a flexible layer of electrically conductive material patterned to form a plurality of adjacent heat spreading elements, each heat spreading element having a first electrical connection pad and a second electrical connection pad, wherein each of a plurality of mounting vias exposes the first electrical connection pad of an associated heat spreading element in independent claim 35.

Conclusion

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (571) 272-1781. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The Fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the -status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

Art Unit: 2818

applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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05/09/05



Andy Huynh

Patent Examiner